

REMARKS

The Applicant thanks the Examiner for the careful examination of this application and respectfully requests the entry of the amendments indicated hereinabove.

Claims 14-20 are currently pending and rejected. Claims 14, 15, and 17 are amended hereinabove. Regarding Claim 17, the Applicant respectfully submits that it is common practice in the industry to mix vapor HF solutions by volume and therefore Claim 17 was not indefinite as originally written.

Amended Claim 14 positively recites exposing a single semiconductor wafer in a transfer chamber module to a vaporous solution and removing an oxide layer from the semiconductor wafer with the vaporous solution. These advantageously claimed features are not taught or suggested by the patents granted to Kikuchi, Hawthorne et al., or Huang et al., either alone or in combination.

Kikuchi teaches away from the current invention because Kikuchi teaches the removal of native oxide film by a dual-step/dual-chamber cleaning process before a film can be formed on a clean silicon surface (column 11 lines 35-42). More specifically, Kikuchi teaches that a wafer is “transported through” the transfer/alignment chamber 120 (column 11 lines 35-36) to a HF process chamber 105 for a HF vapor process (column 11 lines 36-37). Then the wafer is moved by

the transfer/alignment chamber 120 (column 11 lines 16-19) to a second chamber 130 (column 11 lines 38-39) for the removal of residual by-products (column 11 lines 38-39). Then the wafer is moved by the transfer/alignment chamber 120 (column 11 lines 26-27) to a third chamber 140 (column 11 lines 39-40) for the film formation (column 11 lines 40-42). (See also FIGS. 10-11.) In addition, Kikuchi teaches away from the current invention because Kikuchi teaches that the transfer/alignment chamber 120 merely transports the wafer (column 11 lines 14, 17-19, 35). Therefore, Kikuchi does not teach exposing a single semiconductor wafer in a transfer chamber module to a vaporous solution that removes the oxide layer as advantageously claimed.

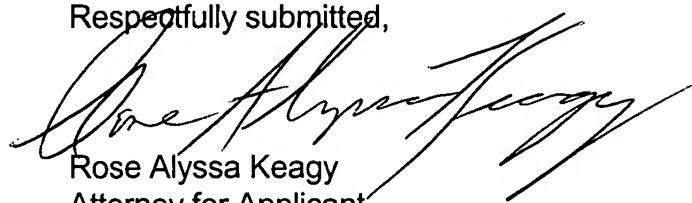
Hawthorne et al. teaches that a portion of their native oxide film cleaning process is conducted in a deposition chamber (column 2 lines 44-27, column 3 lines 54-56). Therefore, like Kikuchi, Hawthorne et al. teaches a dual-step/dual-chamber process. More specifically, Hawthorne et al. teaches a cleaning process where a HF vapor clean is performed in a “first chamber” (column 3 lines 63-64) or a “cleaning chamber” (column 4 lines 17-19), and then the wafer is removed from the “first chamber” (column 6 lines 64-65) or “cleaning chamber” (column 4 lines 23-25) into a “second chamber” (column 3 lines 65-67) or “deposition chamber (column 4 lines 24-25) to perform their required step (column 3 lines 44-47) of heating the surface of the wafer (column 4 lines 3-10 and 25-27). Like Kikuchi, Hawthorne et al. teaches the use of a “transfer module” that merely transfers the wafers between chambers (column 62-67). Therefore, Hawthorne et al. does not teach an oxide removal process performed in a transfer/alignment chamber as advantageously claimed.

Huang et al. teaches away from the advantageously claimed invention because (like Kikuchi and Hawthorne et al.) Huang et al. teaches that the wafer transport system 52 merely carries the wafers between chambers such as the vapor cleaning system 56 and the LPCVD furnace 54 (column 7 lines 11-14). Huang et al. teaches that the wafer transfer system 52 is separate from the vapor cleaning system 56 (column 7 lines 5-8, FIG. 6). Therefore, Huang et al. does not teach exposing a single semiconductor wafer in a transfer chamber module to a vaporous solution that removes the oxide layer as advantageously claimed.

For the foregoing reasons, the Applicant respectfully traverses the Examiner's rejection of Claim 14 and respectfully asserts that Claim 14 is patentable over Kikuchi, Hawthorne et al., and Huang et al., either alone or in combination. Furthermore, Claims 15-20 are allowable for depending on allowable independent Claim 14 and, in combination, including limitations not taught or described in the references of record.

For the reasons stated above, this application is believed to be in condition for allowance. Reexamination and reconsideration is requested.

Respectfully submitted,



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